AMENDMENTS TO THE DRAWINGS

Please accept the attached replacement sheets for Figure 44 and Figure 48.

REMARKS

Status of the Claims

Claims 1, 3-6, and 8 are currently present in the Application, and claim 1 is an independent claim. Claims 1, 3, and 8 have been amended, and claims 2, 7, and 9-24 have been canceled. Support for the amendments to the claims is found, for example, in Applicants' specification on page 52, line 9 through page 57, line 18 (also see Figures 46 through 49). No new matter has been added as a result of the amendments.

Applicants are not conceding that the subject matter encompassed by claims 1-24, prior to this Amendment, is not patentable over the art cited by the Examiner. Claims 1, 3, and 8 were amended, and claims 2, 7, and 9-24 were canceled, solely to facilitate expeditious prosecution of the remaining claims. Applicants respectfully reserve the right to pursue claims, including the subject matter encompassed by claims 1-24, prior to this Amendment, and additional claims, in one or more continuation and/or divisional patent applications.

Drawings

Applicants note with appreciation the Examiner's acceptance of Applicants' formal drawings, filed with the Application on September 25, 2003. Note that Applicants have attached replacement sheets for Figure 44 and Figure 48 in order to correct inadvertent, typographical errors. No new matter has been added.

Amendments to the Title

The title of the Application has been amended. No new matter has been added as a result of the amendments to the title.

Amendments to the Abstract

The Abstract has been amended. No new matter has been added as a result of the amendments to the Abstract.

Amendments to the Specification

The specification has been amended to correct inadvertent, typographical errors. No new matter has been added as a result of the amendments to the specification.

Claim Rejections Under 35 U.S.C. § 112

Claims 7, 15, and 23 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Applicants have canceled claims 7, 15, and 23, and therefore respectfully submit that the rejections under 35 U.S.C. § 112, first paragraph, are now moot.

Claim Rejections - Alleged Anticipation Under 35 U.S.C. § 102

Claims 1-6, 8-14, 16-22, and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kauffman et al., U.S. Patent No. 6,199,179 (hereinafter Kauffman). Applicants respectfully traverse the rejections under 35 U.S.C. § 102.

To anticipate a claim, the reference must teach every element of the claim (Manual of Patent Examining Procedure § 2131). Applicants respectfully submit that Kauffman does not teach every element of independent claim 1. As amended, independent claim 1 includes the following elements:

- executing an operating system by one or more first processors included in a group of heterogeneous processors;
- loading a device module corresponding to one or more secondary processors included in the group of heterogeneous processors into the operating system, wherein the first processors are of a first processor type and the second processors are of a second processor type;
- loading an application using the operating system, the application including device-oriented instructions adapted to control the one or more of the secondary processors;

- setting up a device-like access path for a selected secondary processor, the device-like access path being used by the application to access the selected secondary processor;
- executing the application on one of the first processors;
- detecting a device call from the application, wherein the device call is a request from the application to load device-oriented instructions to the selected secondary processor;
- in response to the detecting, loading the device-oriented instructions to a system memory accessible by the selected secondary processor;
- performing the device-oriented instructions at the selected secondary processor;
- in response to the performing, storing processed data in an output buffer in the system memory;
- notifying the operating system that the device-oriented instructions have been performed; and
- reading, by the application, the processed data from the output buffer;

Kauffman purports to teach multiple instances of operating systems executing cooperatively in a single multiprocessor computer (see Kauffman, Abstract). While Kauffman does disclose multiple processors, Kauffman does not appear to disclose "a group of heterogeneous processors," where one or more first processors "are of a first processor type," and one or more second processors "are of a second processor type," as taught and claimed by Applicants in independent claim 1. Kauffman notes that each basic system building block "is identical and comprises several CPUs" (Kauffman, col. 7, lines 34-46). Kauffman further notes that CPU nodes "are assumed to be capable of operation as a primary CPU" (Kauffman, col. 18, lines 25-30). Throughout Kauffman, it appears that CPUs may be assigned to partitions as needed. Kauffman does not appear to use, or be at all concerned with, different types of processors, such as the heterogeneous processors that are taught and claimed by Applicants. While Kauffman discusses "primary processors" and "secondary processors" throughout its description,

there is no indication that these processors are of different types. Rather, it appears that Kauffman designates a processor as "primary" or "secondary" depending on the work performed by the processor, and not on the type of processor. It appears that any processor in a partition may be selected as the primary processor (Kauffman, col. 9, lines 52-60), and no distinction is made between a first processor type and a second processor type, as taught and claimed by Applicants in independent claim 1.

Applicants claim "executing an operating system by one or more first processors included in a group of heterogeneous processors," and "loading a device module corresponding to one or more secondary processors included in the group of heterogeneous processors into the operating system, wherein the first processors are of a first processor type and the second processors are of a second processor type." Applicants further claim "loading an application using the operating system, the application including device-oriented instructions adapted to control the one or more of the secondary processors." The Office Action cites Kauffman at col. 3, lines 60-66 as teaching this aspect of Applicants' claims (see Office Action, pages 3-4). The cited section of Kauffman discusses cells that represent a control domain of machine modules, each module including processors, memory, and I/O. While applications run on these cells, Kauffman does not teach an application that includes "device-oriented instructions adapted to control the one or more secondary processors," where the secondary processors are specifically claimed to be of a different type than the first processors, as taught and claimed by Applicants.

Applicants further teach and claim "setting up a device-like access path for a selected secondary processor, the device-like access path being used by the application to access the selected secondary processor." The Office Action cites Kauffman's Abstract and col. 5, lines 60-65 as teaching this aspect of Applicants' claims (see Office Action, page 4). However, the cited portions of Kauffman are discussing the migration of processors due to failure. Kauffman does not discuss "setting up a device-like access path" where the device-like access path is "used by the application to

access the selected secondary processor." The cited sections of Kauffman do not teacj a "device-like access path," as taught and claimed by Applicants.

Kauffman also does not teach "detecting a ***device call*** from the application, wherein the device call is a request from the application to load device-oriented instructions to the selected secondary processor," as taught and claimed by Applicants. Applicants further claim that in response to detecting a device call from the application, "loading the device-oriented instructions to a system memory accessible by the selected secondary processor," "performing the device-oriented instructions . . .," "storing processed data in an output buffer in the system memory," "notifying the operating system that the device-oriented instructions have been performed," and then "reading, by the application, the processed data from the output buffer." None of these elements appear to be present in Kauffman. Kauffman is concerned with failure recovery in a multiprocessor system, and does not teach detecting a device call from an application, loading and performing device-oriented instructions, storing processed data, notifying the operating system, and reading the processed data by the application.

Because Kaffman does not teach many of the claimed elements of independent claim 1, Applicants respectfully submit that independent claim 1 is not anticipated by Kauffman. Therefore, Applicants respectfully request that independent claim 1, and the claims which depend from it, be allowed.

Claim Rejections – Alleged Obviousness Under 35 U.S.C. § 103

Claims 7, 15, and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kauffman in view of Yamazaki, U.S. Patent No. 5,812,843 (hereinafter Yamazaki). Applicants respectfully traverse the rejections under 35 U.S.C. § 103.

Applicants have canceled claims 7, 15, and 23, and therefore respectfully submit that the rejections to these claims is now moot.

Conclusion

As a result of the foregoing, it is asserted by Applicants that the remaining claims in the Application are in condition for allowance, and Applicants respectfully request an early allowance of such claims.

Applicants respectfully request that the Examiner contact the Applicants' attorney listed below if the Examiner believes that such a discussion would be helpful in resolving any remaining questions or issues related to this Application.

Respectfully submitted,

By /Leslie A. Van Leeuwen, Reg. No. 42,196/
Leslie A. Van Leeuwen, Reg. No. 42,196
Van Leeuwen & Van Leeuwen
Attorneys for Applicant
Telephone: (512) 301-6738
Facsimile: (512) 301-6742